

Assessing the Financial Impact and Return on Investment from Ecological and Environmental Interventions at the Workplace

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The Problem of Obesity

More than half of all Americans are overweight or obese, and the prevalence of these risk factors has increased dramatically in the past decade. Obesity is a risk factor for several chronic disease conditions including type-2 diabetes, cardiovascular disease, several cancers (endometrial, post-menopausal breast, kidney, and colon), musculoskeletal disorders, depression, sleep apnea, and gallbladder disease.

The national medical cost burden attributable to overweight and obesity is estimated to be between \$60 and \$93 billion (in 2002 dollars), or 5.7 to 9.1% of U.S. spending on healthcare (Wolf and Colditz, 1998 and Finkelstein et al., 2003). Employers pay about a third of the total nation's \$1.6 trillion annual medical bill, including an estimated \$13 billion on obesity related disorders (Koretz, 2000). In addition, obesity is estimated to cause 39 million lost workdays and 239 million restricted activity days (Koretz, 2000).

Business leaders are becoming increasingly aware of the human and economic burden that poor health imposes on their workers and their companies' competitiveness. Many employers have invested in health promotion and disease prevention programs aimed at reducing the prevalence of obesity in the workplace through encouragement of physical activity, healthy diet, and improved management of health risk factors. Employers continue to seek innovative and evidence-based interventions that can be imported into the workplace to address a growing public health epidemic that also adversely affects worker productivity. A large body of literature supports the application of individualized health promotion interventions directed at reducing employees' health risk factors including overweight and obesity, but there is growing interest in interventions that support individual change efforts through the creation of more supportive environments.

The Obesity Epidemic in the Workplace.

In the U.S. labor force, it is estimated that 38.8% of men and 20.7% of women, between the ages of 25 and 54.9, are classified as overweight (Thompson, Eldelsberg, Kinsey, & Oster, 1998), compared with 40.7% of men and 23.1% of women in the U.S. general population (Must et al., 1999). Further, within the same age group, 19.4% of men and 25% of women are classified as obese (Thompson et al., 1998), compared with 29.9% of men and 23.4% of women in the general population (Must et al., 1999). Thus, although the prevalence of overweight and obesity in the workforce is slightly lower than in the general adult population, still over half of all workers are either overweight or obese.

Economic Impact of Overweight and Obesity.

The Centers for Disease Control and Prevention estimates the annual national medical cost burden attributable to overweight and obesity to be \$117 billion, in direct and indirect costs (CDC, 2003). Of that amount, an estimated \$75 billion in direct medical expenditures (Finkelstein, Fiebelkorn, & Wang, 2004) is spent on treating obesity-related disorders (DHHS, 2003). Studies have shown that obese employees take more sick leave than their non-obese counterparts and that they are twice as likely to experience high levels of absenteeism, defined as seven or more absences due to illness over a six month period (Tucker & Freidman,

1998). Other research examining medical claims data indicates that as BMI increases, so does health care utilization and associated expenditures (Pronk et al., 2004; Goetzel et al., 2000; Heithoff, Cuffel, Kennedy, & Peters, 1997).

Strum (2002) estimated annual excess medical costs attributable to obesity and overweight to be \$395 (36%) higher than for those of normal weight. Goetzel et al. (1998) analyzed person-level medical claims and health risk data for approximately 46,000 employees of six large private and public sector organizations. They calculated the annual excess costs of being overweight or obese to be \$747 (in 1998 dollars) or 21% higher than those not overweight. The analysis controlled for demographics, job type and medical plan as well nine other modifiable risk factors (Erfurt et al., 2001). An environmental analysis of the same database (Anderson, Whitmer, Goetzel, et al., 2000) found that the dollar impact for each high-risk factor was multiplied by the prevalence of that risk factor in the population.

In total, obesity-related disorders cost employers an estimated 39.3 million lost workdays, 239 million restricted activity days, and 62.7 million visits to the doctor. Obesity-related conditions are estimated to cost U.S. business \$13.0 billion dollars annually, with \$8.0 billion spent on health insurance expenditures, \$2.4 billion for sick leave, \$1.8 billion for life insurance, and \$1.0 billion for disability insurance (DHHS, 2003).

Obesity and the Environment.

Physical inactivity and unhealthy eating behaviors have long been associated with obesity. Recently, however, researchers have started exploring obesity from a social-ecological framework (Stokols, 1996), suggesting that varying degrees of biological, psychological, behavioral and environmental factors are associated with obesity and overweight in healthy adults. While there is not an extensive existing body of literature on the environment as a determinant for obesity or overweight, there is research to support the contention that accessibility of sidewalks, street lights, fitness facilities, parks (Bourdeaudhuji, Sallis, & Saelens, 2003), cycling paths (Sharpe, Granner, Hutto, & Ainsworth, 2004), and overall aesthetics (Humpel, Owen, Marshall, Bauman, & Sallis, 2004) are associated with increased physical activity. Furthermore, perceptions of a safe neighborhood are also positively associated with increased physical activity (Humpel, Owen, & Leslie, 2002). Similarly, negative perceptions of environment (Catlin, Simoes, & Brownson, 2003; Giles-Corti, Macintyre, Clarkson, Pikora, & Donovan, 2003), no sidewalks (Humpel et al., 2002), sedentary jobs, decreased household physical activity, accessibility of restaurants, (Franklin, 2001), and leisure time spent watching TV or surfing the Internet, (Humpel et al., 2002) have all contributed to overweight and obesity among American adults.

Workplace-Based Health Promotion Interventions.

According to the *Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*, workplaces offer a unique opportunity to promote health behavior change and the adoption of a healthier lifestyle (DHHS, 2001). Most adults spend at least eight hours a day at the workplace, therefore creating an opportunity to provide individual, group and organizational level interventions to a large number of adults in one setting. Existing reviews of workplace healthy promotion literature suggest that the majority of workplace health interventions, to increase physical activity or change dietary habits, have utilized individual behavioral approaches of short duration and minimal intensity, report variable amounts of weight loss, and fail to report maintenance data (Bull, Gillette, Glasgow, & Estabrooks, 2003; Dishman, Oldenburg, O'Neil, & Shepard, 1998; Heaney & Goetzel, 1997; Hennrikus & Jeffery, 1996; Wilson, Holman, Hammock, 1996). However, a recent review of the clinical and cost-effectiveness of comprehensive health promotion interventions in the workplace by Pelletier (2001) indicates that when well-executed large-scale corporate initiatives, such as those implemented at Johnson and Johnson, Dupont, Bank of America, Tenneco, Duke University, and the California Public Retirees System, are well integrated into the human resources strategy of the organization, they are more likely to be well accepted and effective.

Return on Investment for Workplace Health Promotion Programs.

Goetzel et al. (1999) conducted a comprehensive literature review on the return on investment (ROI) for health, demand, and disease management programs. The review found that ROI estimates ranged from \$1.40 in benefits per dollar spent on the program, to a high of \$13 per dollar spent, with traditional health promotion programs garnering a median ROI of 3.14 to 1.0. More recently, Aldana (2001) performed a comprehensive literature review of the financial impact of health promotion and disease prevention programming on health care costs. In his analysis, only four of the 28 studies reported no effects of health promotion and disease prevention programming on health care costs. The average ROI for studies reporting ROI was \$3.48 for every dollar expended. In a widely cited example of a rigorous ROI analyses, Citibank reported a savings of \$8.9 million in medical expenditures attributable to their comprehensive health promotion program as compared to their \$1.9 million investment on the program, thus achieving an ROI of 4.56 to 1.0 (Ozminkowski et al., 1999).

Physical Environmental Interventions.

Evidence suggests that physical environmental interventions are successful in increasing physical activity (French, Story, & Jeffery, 2001; Russell, Dzewaltowski, & Ryan, 1999; Anderson et al., 1998; Blamey, Mutrie, & Aitchison, 1995; Brownell, Stunkard, & Albaum, 1980) and altering dietary habits (French et al., 2001; Biener, Glanz, McLerran, Sorensen, Thompson, Basen-Enquist, Linnan, & Varnes, 1999; Holdsworth & Haslam, 1998; French, Story, Jeffery, Synder, Eisenburg et al., 1997; Jeffery, French, Raether, & Baxter, 1994; Sorenson, Morris, Hunt, Herbert, Harris, Stoddard, & Ocklene, 1992; Zifferblatt, Wilbur, & Pinsky, 1980). For example, signs that prompt staircase use been shown to significantly increase such use in a train station by 63% (Blamey et al., 1995, Brownell et al., 1980), in a shopping mall by 113% (Brownell et al., 1980) and a in a library by 5.5% (Russell et al., 1999). Furthermore, an intervention to reduce the price of healthy foods in vending machines increased sales of those foods by 78% (French et al., 1997) and interventions to reduce the price of healthy foods in cafeterias produced similar results (Biener et al., 1999; French et al., 1997; Jeffery et al., 1994). In addition, interventions in which food labels were included in cafeterias produced a 5% decrease in caloric intake (Zifferblatt et al., 1980) and a 5% reduction in fat consumption (Sorenson et al., 1992).

Environmental Workplace Interventions.

While the aforementioned research on physical environmental interventions is applicable to workplace settings, there is other relevant research supporting the use of multi-level organizational and environmental interventions. A recent study examined the effects of increasing organizational support for employee heart health in twenty companies. The intervention consisted of seven training sessions designed to increase awareness and support for the “Healthy Heart” program implemented in 1995 by the New York State Department of Health. Following the intervention period, administrative and organizational support for the program increased significantly compared to control sites and the program was shown to be cost-effective (Golaszewski, Barr, & Cochran, 1998).

The Working Well Trial investigated the effects of changing social and physical environments in order to promote a reduction in smoking and poor dietary behaviors by employees. Significant effects were observed on all nutrition outcomes, including a 5.5% increase in access to healthy foods, a 56% increase in nutrition information provided, a 24% increase in perceptions of co-worker support for low-fat diet, and a 28% increase in perceptions of management concerns about employees’ nutrition. While significant outcomes were observed for nutrition, significant benefits were not found for smoking norms or smoking policies (Biener, et al., 1999). However, a recent review on the health impact of worksite smoking cessation programs by Erikson & Gottlieb (1998) found that the existing literature was suggestive for group and incentive interventions; indicative for minimal interventions, competitions, and medical interventions; and acceptable for the testing of incremental effects. In other words, these results suggest that the social environment of a worksite helps foster behavior change.

Research also supports the use of individual and group competitions, financial incentives (Pescatello, Murphy, Vollono, Lynch, Berne, & Constanzo, 2001; Poole, Kumpfer & Pett, 2001), and/or goal setting at workplaces to increase participation in weight loss interventions (Glanz, Sorenson, & Farmer, 1996). Thus, it appears that interventions that combine both educational and environmental strategies produce greater effects than only individual approaches (Biener et al., 1999; Erikson & Gottlieb, 1998; Golaszewski, et al., 1998; Sorenson, Hunt, Cohen, Stoddard, Stein, Phillips et al., 1998; Glanz et al., 1996; Hennrikus & Jeffery, 1996). These implications are consistent with approaches, outlined in the *Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*, that encourage workplaces to move beyond traditional health education and awareness to include worksite policies, and physical and social environments (DHHS, 2001).

Finally, Erfurt et al. (2001) compared the relative effectiveness of four randomly assigned levels of health promotion interventions at four different automobile assembly plants. Site 1 received a “wellness screening” during which blood pressure, height, weight and smoking status were measured. Employees at risk were referred to treatment or risk reduction resources in the community. At site 2, employees participated in the same screening activities and then referred to on-site health improvement classes. Site 3 added personalized counseling and outreach to high-risk employees. Site 3 also offered a “menu” of health promotion interventions including self-help materials, on-on-one consultations, and mini group interventions. Site 4 offered the most comprehensive program of all. In addition to all the programs offered at site 3, site 4 also provided organized activities and peer support for behavioral change (e.g., buddy systems and informal health networks) and programs to increase awareness of health issues throughout the plant (e.g., weight loss contests and plant-wide smoke-outs). Results from a 3-year follow-up showed that all four sites experienced reductions in risk but that sites 3 and 4 achieved the greatest amount of risk reduction. The two sites that included individualized risk reduction, a menu of risk reduction programs, and a social setting that supported behavior change experienced significantly greater gains in the areas of blood pressure control, weight loss, and smoking cessation.

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